# The basics of boiling

The type of bond (like glue!) that holds the atoms together in a molecule is very strong. It is called a covalent bond. However, the force between molecules is very weak. It is called a weak intermolecular force.

Make a few molecules of water using molymods (or plastercine) and place into a cup or beaker. Look at your beaker and draw a sketch of the atoms; hydrogen atoms can be represented by ○ and oxygen by ●

Then imagine that the water is boiling, draw a sketch of the molecules of water as they escape into the air as steam/water vapour/gas.

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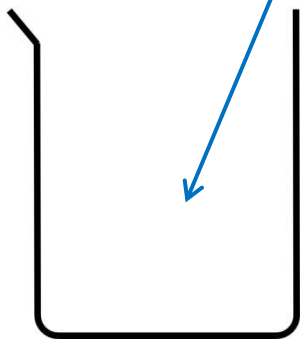
|  *molecules of water (liquid) in a beaker* | boiling → | *molecules of water vapour (steam/gas) in the air after being heated above 100'C* |

A common misconception is that the atoms of oxygen and hydrogen separate from each other when water boils. However, as water molecules are heated the atoms of oxygen and hydrogen do not separate from each other.


## Questions

1. Why do you think atoms of O and H do not separate from each other?
(*tip: think about the bonding*)

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As water is heated the molecules of water do separate from each other.

2. Why do you think this is? (think about the forces between the molecules)

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So, to conclude, the atoms in a molecule of water do not separate from each other because the covalent bonds between the atoms are very strong. However, the weak intermolecular forces between the molecules do break so the water molecules can move around freely with high energy and separate from each other. This is also the case for a substance that is melting, forces between molecules must be broken.